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SPECIFICATION FOR OPHTHALMOSCOPE

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Indian Standard

SPECIFICATION FOR OPHTHALMOSCOPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 23 November 1976, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 While the ophthalmoscopic head covered in IS : 7007-1973* is intended for use by general practitioners, this standard covers the requirements of ophthalmoscope intended for diagnostic purposes by the ophthalmic practitioners, physicians and surgeons.

1. SCOPE

1.1 This standard covers the requirements for ophthalmoscope used to examine the fundus of the eye.

2. DESCRIPTION

2.1 Ophthalmoscope is an endoscopic instrument used by ophthalmic practitioners, physicians and surgeons. This is a hand held instrument using 2·8 V bulb with dry cells for illuminating the patient's eye. Alternatively, it may also have rechargeable Ni-Cd cells or a step down transformer so that the instrument can be used from the mains.

2.2 The optical arrangement consists of a filament imaged by a system of lenses at the reflecting surface of a reflector which may be a back silvered mirror or a prism. The light beam diverges from the reflecting surface towards the pupil of the eye to be viewed. The light entering the pupil illuminates an area of the retina. Two or three circular or slit apertures, red free filter and graticule can be introduced in between the mirror and the condensing lens as may be desired. These are mounted on a circular disc which can be rotated with a finger control. An ON/OFF switch is provided with a rheostat to control the intensity of illumination. In order to compensate for accommodation and dioptric power of both the patient and the doctor, lenses of varying power (0 to + 20 dioptres and 0 to −25 dioptres) (*see* **3.17**) are mounted on a circular disc. Any lens can be introduced between the pupil of the patient and the doctor's eye by a finger control. Dioptric power of the lens introduced can be read through a window fitted with a magnifying lens.

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*Specification for E. E. N. T. (eye, ear, nose and throat) diagnostic set.

3. GENERAL REQUIREMENTS

3.1 Body shall be made of aluminium alloy or any other suitable material.

3.2 The cell container shall be of suitable design so as to provide handle to the instrument.

3.3 The handle of the instrument shall be designed to hold two leak-proof cells. Access to the cells shall be provided by unscrewing the lower cap of the handle.

3.4 Coating and plating of each part shall be durable and shall be able to resist discolouration, wear and corrosion.

3.5 All brass parts shall be nickel and chromium plated and aluminium parts anodized and dyed. Nickel and chromium plating shall conform to Grade 3 of IS : 4827-1968* and anodizing to IS : 1868-1968†.

3.6 The dimensions of the threaded and mating portions shall be such as to ensure interchangeability of spare parts.

3.7 Optical components shall have anti-reflection coating wherever necessary and shall conform to IS : 988-1959‡.

3.8 All sharp edges shall be removed.

3.9 The lamp used shall be of pre-centred and prefocus type and of 2.8 V.

3.10 An easy access for the replacement of the lamp shall be provided.

3.11 The rheostat used shall conform to **14.0** of IS : 2934 (Part I)-1964§ wherever applicable.

3.12 The lamp holder assembly shall have a close running fit with the carrier tube.

3.13 The prism holder assembly shall have an easy slide fit with the carrier tube and it shall be detachable with minimum force.

3.14 An aperture disc with rotary control selection shall be provided for:

a) macular beam,
b) wide angle beam,

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*Specification for electroplated coatings of nickel and chromium on copper and copper alloys.

†Specification for anodic coatings on aluminium (*first revision*).

‡General requirements for optical components.

§Specification for non-wire-wound variable resistors (potentiometers), Type 2: Part I Tests and general requirements.

c) red free filter,
d) eccentric fixation detector, and
e) slit beam.

3.15 Two spare lamps shall be provided with each instrument.

3.16 The construction of the disc carrying the lenses shall be such that it is possible to clean the lenses and the alignment shall not get disturbed after cleaning and replacing the lenses. It shall also be possible to clean all contact points.

3.17 The lenses shall have positive powers of 1, 2, 3, 4, 5, 6, 8, 10, 12, 15 and 20 dioptres and negative powers of 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20 and 25 dioptres. The dioptric powers shall be marked in two different colours; red for positive powers and black for negative powers.

3.18 Opening of the lens housing and dioptric lenses shall be in perfect alignment.

3.19 Each instrument shall be provided with an instructional booklet giving specially the details about the dry cells and lamps to be used and also the operational details of the instrument.

4. FUNCTIONAL REQUIREMENTS

4.1 When the complete aperture disc or spherical lens is brought in the path of the light beam, it shall click into position without any tendency to slip even after slight jerk.

4.2 The light from the lamp shall clearly illuminate the number indicating the dioptric power of the lens introduced between the patient's pupil and the doctor's eye. A magnifying lens arrangement shall be provided on the body of the instrument to facilitate easy reading of the dioptric power.

4.3 Function of OFF/ON switch shall be satisfactory with suitable locking arrangement in the OFF position.

4.4 The contact pressure between the slider and the resistance element of the rheostat shall be maintained uniformly by positive pressure and shall be such as to permit smooth regulation of the potentiometer over the entire range of mechanical rotation.

4.5 Alignment of the prism and divergence of the lens system shall be such that pupil of the patient is illuminated in the region seen through the viewing window.

4.6 The intensity of illumination of the beam projected into the patient's pupil shall be uniform and illuminated field shall be divergent circular unless an aperture of different design is used and shall have no shadow when seen through the dioptric lenses.

4.7 There shall be no play in the movement of the aperture disc and the disc carrying dioptric lenses. These discs shall be in perfect alignment with the viewing aperture.

4.8 The angle of divergence of the beam shall not be less than 40°.

4.9 The intensity of illumination of the emergent beam shall not be less than 6 lux at a distance of 15 cm.

5. FINISH

5.1 The ophthalmoscope shall be finished smooth all over. The metallic components shall be given appropriate finish to protect them against atmospheric corrosion. The interior surfaces shall be finished dull black to minimise stray reflection.

6. TESTS

6.1 The ophthalmoscope shall be examined for the following external defects:

a) Loose, missing or damaged screws;
b) Scratched, broken or dirty optical surfaces;
c) Damage to the cell container; and
d) Damage to the external finish.

6.2 Dioptric lens and the opening in the lens housing disc shall be in alignment and prism holder shall not obstruct the vision when seen through the dioptric lenses. For testing this, a plane white surface, illuminated with the emergent beam of light shall be viewed through the dioptric lenses. There shall be no obstruction of the vision by the prism holder.

6.3 The rotation of the lens housing disc shall be smooth. The disc shall be set for different powers and a few jerks shall be given to the instrument. The lens shall not get displaced from the set position.

6.4 Each housing of the lens holder shall have correct lens in it. The powers of lenses shall be tested with the help of a dioptometer. The lens power shall not vary by more than ± 0·25 dioptres of the stipulated value.

6.5 The angle of divergence of the emergent beam shall be checked. This may be calculated by measuring the diameter of the patch formed on the ground-glass screen. The angle shall not be less than 40°.

6.6 The intensity of illumination when checked by a standard photometer shall not be less than 6 lux at a distance of 15 cm.

6.7 Dioptric markings shall be checked for ease of reading in the dark under internal illumination.

6.8 Rheostat shall be checked for providing gradual variation of light intensity.

7. MARKING

7.1 The case and the instrument head shall be marked with the manufacturer's name, trade-mark and serial number.

7.1.1 The ophthalmoscopes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 The ophthalmoscope shall be so securely packed for storage and transit that there is no liability whatsoever for any deterioration or damage taking place. The carrying case shall be suitably lined inside with velvet to protect the instrument from damage.

(*Continued from page* 2)

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